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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/764,144	01/23/2004	Martin Sauerland	22715	6073

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EXAMINER	
ANDERSON, DENISE BROWN	

ART UNIT	PAPER NUMBER
2877	

DATE MAILED: 02/28/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

A

Office Action Summary	Application No.	Applicant(s)	
	10/764,144	SAUERLAND ET AL.	
	Examiner	Art Unit	
	Denise B. Anderson	2877	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 July 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-26* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *15-18 and 20-26* is/are allowed.

6)☒ Claim(s) *1, 14 and 19* is/are rejected.

7)☒ Claim(s) *2-13* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *23 January 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *7/13/04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Drawings

Figure 5 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed. See MPEP § 606.

The following title is suggested: Method and Device for Measuring Wall Thickness Using Multiple Control Circuits for Improved Stability".

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 19 is rejected as the examiner cannot determine what the applicant is determining the "difference between". (i.e., "between the measured signal of said photodiodes" and what?). Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Heon et al (US Patent No. 5,137,361).

As to claim 1, the applicant claims an ultrasonic pulse, an illuminating laser, a Fabry-Perot interferometer (FPI), a photodiode, measuring thickness based on photodiode output, providing one of three types of control signals, controlling a linear actuator, and regulating a photodiode. Heon et al discloses, in figures 1 and 4, an object 1 (this object could be a pipe or any other number of different types of objects) to which an ultrasound wave and laser are applied (column 4, lines 18-22) and from which the beams are scattered. An optical fiber 7 and collecting optics 9 direct the scattered light to a Fabry-Perot interferometer 11 (column 4, ines 23-29). The output from the FPI is fed to a photodetector 19 for generating an electrical signal representative of the motion of the surface of the object and to detector 23. Detector 23 also receives a signal output from the FPI. Divider 25, differential amplifier 29 and stabilization network 31 are connected together and used to control the PZT pusher 33, a linear actuator that controls the spacing between the mirrors of the FPI, and thereby, controlling the resonant frequency (column 4, lines 38-50). Heon et al does not expressly disclose that

the photodiode is regulated with the output of the amplifier. One definition of regulate is "to adjust to a particular specification or requirement". In figure 3, Heon et al discloses amplifiers 45, 47 with adjustable gains (column 5, lines 5-10). It can be seen from figure 3 that the photodiode 23 is indirectly adjusted based on the changes in the signal received at the PZT pusher 33, which is based on the output from the amplifiers 45, 47 that are part of the control loop. It would have been obvious to one of ordinary skill in the art at the time of the invention to control the photodiode for the purpose of achieving enhanced stabilization of the interferometer.

Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Heon et al (US Patent No. 5,137,361), and further in view of Monchalin et al (US Patent No. 6,078,397).

As to claim 14, the applicant claims an ultrasonic pulse, an illuminating laser, a Fabry-Perot interferometer (FPI), a photodiode, measuring thickness based on photodiode output, controlling a linear actuator, and a pyrometer. Heon et al discloses, in figures 1 and 4, an object 1 (this object could be a pipe or any other number of different types of objects) to which an ultrasound wave and laser are applied (column 4, lines 18-22) and from which the beams are scattered. An optical fiber 7 and collecting optics 9 direct the scattered light to a Fabry-Perot interferometer 11 (column 4, ines 23-29). The output from the FPI is fed to a photodetector 19 for generating an electrical signal representative of the motion of the surface of the object and to detector 23. Detector 23 also receives a signal output from the FPI. Divider 25, differential amplifier

29 and stabilization network 31 are connected together and used to control the PZT pusher 33, a linear actuator that controls the spacing between the mirrors of the FPI, and thereby, controlling the resonant frequency (column 4, lines 38-50). Heon et al discloses the claimed invention except for a pyrometer for measuring temperature and providing an input to the controller for the linear actuator. Monchalin et al discloses a method for determining wall thickness using the temperature input from a pyrometer 16 in figure 2 (see also column 1; lines 50-57; column 4, lines 22-23; column 5, lines 48-51). Ultrasonic determination of thickness is based on the measurement of the time-of-flight between echoes produced by the ultrasonic wave reverberating within the tube (or object) wall, and the ultrasonic velocity is a function of the material itself and of its temperature. This temperature can be measured with a pyrometer as is shown in Monchalin (column 1, lines 50-57). It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teachings of Heon et al with the teachings of Monchalin et al (i.e., use the pyrometer to measure the temperature and provide it as an input for controlling the FPI, leading to calculating the thickness) for the purpose of more accurately determining the thickness of an object.

Allowable Subject Matter

Claims 2-13 and 15 - 26 are allowable.

Claims 2-13 are objected to as being dependent upon a rejected base claim (1), but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

Claims 2 is allowable because the prior art of record, taken alone or in combination, fails to disclose or render obvious a second control circuit with a second controller for controlling the amplifiers based on preset variables in combination with the rest of the limitations of claim.

Claims 3-5 and 8-13 are allowable because they depend from claim 2, which has the allowable subject matter stated above.

Claims 6 and 7 are allowable because they depend from claims 2 and 5 respectively. Furthermore, claim 5 depends from claim 2, which has the allowable subject matter as stated above.

Claim 15 is allowed because the prior art of record, taken alone or in combination, fails to disclose or render obvious a control circuit for regulating the amplifiers in combination with the rest of the limitations of claim.

Claims 16-18 and 20-26 are allowable because they depend on an allowed independent claim (15).

Claim 19 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Monchalin (US Patent No. 4,966,459) discloses a method for optically detecting motion from a scattering surface with a FPI and 2 stabilization networks.

Monchalin (US Patent No. 4,659,224) discloses a method for ultrasonic detection of deformations of a work surface with a FPI.

Schultz et al (US Patent No. 5,286,313) discloses a process control system using a polarizing interferometer.

Fax/Telephone Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Denise B. Anderson whose telephone number is 571-272-8324. The examiner can normally be reached on Mon-Fri (9:30 AM - 6 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory J. Toatley Jr. can be reached on 571-272-2800 ext. 77. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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